

Claims

- [c1] 1. A washer system comprising:
a first reservoir containing a freezable washer liquid and having a drain port therein in fluid communication with said freezable washer liquid when said first reservoir is in at least a full state;
a temperature sensor for measuring a critical temperature corresponding to approximately a freezing temperature of said freezable washer liquid;
a drain plug sealingly communicating with said drain port; and
an electrical control unit in operative communication with said temperature sensor and said drain plug, said electrical control unit controlling said drain plug to drain said liquid from said first reservoir in response to said critical temperature.
- [c2] 2. A washer system according to claim 1 wherein said temperature sensor is coupled to said first reservoir and measures a temperature of said freezable washer liquid.
- [c3] 3. A washer system according to claim 1 wherein said temperature sensor measures a temperature of ambient air proximate the first reservoir.
- [c4] 4. A washer system according to claim 1 wherein said drain port is located at a fluid level corresponding to approximately an amount of freezable washer liquid that can freeze without damaging said first reservoir.
- [c5] 5. A washer system according to claim 1 comprising an actuator coupled to said drain plug and in operative communication with said electrical control unit, said electrical control unit controlling said actuator to open said drain plug and drain said liquid from said reservoir in response to said critical temperature.
- [c6] 6. A washer system according to claim 5 wherein said electrical control unit controls said actuator to open said drain plug for a predetermined period of time in response to said critical temperature.
- [c7] 7. A washer system according to claim 1 comprising a fluid level sensor for providing a fluid level signal, said fluid level sensor coupled to said first reservoir, and wherein said electrical control unit controls said drain plug to

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opens said drain plug to drain said liquid from said reservoir in response to said critical temperature and said electrical control unit closes said drain plug in response to said fluid level signal.

[c14] 14. A washer system according to claim 10 wherein said drain port is located at a fluid level corresponding to approximately an amount of freezable washer liquid that can freeze without damaging said first reservoir.

[c15] 15. A washer system according to claim 10 wherein said drain port is located proximate a bottom of said first reservoir and said thermal actuator controls said drain plug to drain said liquid from said reservoir in response to said critical temperature for a predetermined period of time.

[c16] 16. A washer system according to claim 10 comprising an electrical control unit, a temperature sensor in operative communication with said electrical control unit, a second reservoir containing a freeze-resistant washer fluid and at least one pump fluidically connected to said first and second reservoirs, said at least one pump being controlled by said electrical control unit in response to a temperature signal from said temperature sensor.

[c17] 17. A washer system for a vehicle comprising:
a first reservoir containing a freezable washer liquid and having a drain port therein in fluid communication with said freezable washer liquid when said first reservoir is in at least a full state;
a second reservoir containing a freeze-resistant washer fluid;
at least one pump fluidically connected to said first and second reservoirs,
a temperature sensor for measuring a critical temperature corresponding to approximately a freezing temperature of said freezable washer liquid;
a fluid level sensor coupled to said first reservoir and providing a fluid level signal;
a drain plug sealingly communicating with said drain port; and
an electrical control unit in operative communication with said fluid level sensor, said temperature sensor, said at least one pump and said drain plug, said electrical control unit controlling said drain plug to drain said liquid from said reservoir in response to said critical temperature and said fluid level signal,

and said at least one pump being controlled by said electrical control unit in response to a temperature signal from said temperature sensor.

[c18] 18. A washer system according to claim 17 wherein said drain port is located at a fluid level corresponding to approximately an amount of freezable washer liquid that can freeze without damaging said first reservoir.

[c19] 19. A washer system according to claim 17 wherein said drain port is located proximate a bottom of said first reservoir.

[c20] 20. A washer system according to claim 17 wherein said fluid level sensor indicates a fluid level corresponding to approximately an amount of freezable washer liquid that can freeze without damaging said first reservoir and said electrical control unit opens said drain plug to drain said liquid from said reservoir in response to said critical temperature and closes said drain plug in response to said fluid level signal.